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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/177,729	10/23/1998	DAVID S. TAUBMAN	10960578-1	3513

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EXAMINER

TRAN, NHAN T

ART UNIT	PAPER NUMBER
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2615

DATE MAILED: 08/24/2004

17

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/177,729

Applicant(s)

TAUBMAN, DAVID S.

Examiner

Nhan T. Tran

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 June 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 3-6 and 8-29 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 3-6 and 8-29 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed 6/10/2004 have been fully considered but they are not persuasive.

Regarding claim 18, the Applicant asserts that Wober do not design the coefficients from a model of the digital camera. However, the mathematical equation shown in col. 2, lines 25-35 and throughout the reference of Wober is itself a model of the camera since it is used to solve for W (weighting coefficients) in an idealization or conception for such the camera.

The Applicant further asserts that Wober neither designs coefficients from an image model. In response, the Examiner respectfully submits that the specified equation in Wober also represents an image model. Moreover, a **simulated** mosaic image 96 (col. 4, lines 62-67) is an image model for use to determine the weighting coefficients.

Regarding claim 8, the Examiner respectfully submits the same explanations as provided above.

Therefore, the claimed limitations required in the independent claims 8 & 18 are met by Wober.

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Claim Objections

2. Claim 3, 24, 25 are objected to because of the limitation "the at least one property."

There is insufficient antecedent basis for this limitation in the claims.

Claim 4 is objected to because of the limitation "said property." There is also insufficient antecedent basis for this limitation in the claim.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 5, 6, 8, 9, 12-29 are rejected under 35 U.S.C. 102(b) as being anticipated by Wober et al (US 5,475,769).

Regarding claim 18, Wober discloses a method of generating a linear operator for demosaicing of a digital image by a digital camera, the method comprising using at least one of a camera model and an image model to design coefficients of the linear operator, the camera model based on measured parameters of the camera (col. 2, lines 18-35; col. 4, lines 62-67; col. 7, lines 1-40, wherein parameters must be measured by detecting and reducing residual error in

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order to produce the accuracy of weighting coefficients). Note that the response to arguments in section 1 is also applied in this claim.

Regarding claim 8, Wober also discloses a method for processing an input digital image produced by an optical system, the input image having less than full color information at each of a plurality of pixels (col. 4, lines 11-15), the method comprising accessing an operator including an array of demosaicing weights, values of the weights determined from at least one of an image model and an optical system model, the optical system model based on measured parameters of the optical system; and applying the operator to the input image to produce an output image having full color information (full R, G, B) at each of a plurality of pixels (see col. 2, lines 18-35; col. 4, lines 62-67; col. 7, lines 1-40 and the response to the arguments in section 1). It is noted that the optical system model is encompassed by the camera model including a lens parameter (i.e., amount of blurring) which is also inherently included by virtue of calculation of the specified equation, and that the parameter of the lens must be measured to result an amount of blurring as disclosed before residual error is minimized).

Regarding claim 9, Wober further discloses that the operator compensates for degradation in the optical system. See col. 7, lines 1-22, wherein the accuracy of coefficients are derived to also reduce the residual error caused by imperfection of the optical system (col. 7, lines 1-22).

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Regarding claim 5, also disclosed is that the operator depends on an inherent source of illumination used to generate the image (col. 5, lines 37-53, wherein red, green and blue images are formed under an inherent source of illumination).

Regarding claim 6, the operator depends on the type of the scene captured in the image (red scene, green scene, blue scene; col. 7, lines 37-53).

Regarding claim 12, the operator is also based on a set of known images (red, green and blue images; col. 5, lines 57-65).

Regarding claim 13, also disclosed is that different operators are used for different images (col. 5, lines 57-65).

Regarding claims 14-16, also disclosed is a processor for performing the above specified method, an article for a processor, the article including a computer memory encoded with instructions for causing the process to perform the method and a digital camera (163) including a processor programmed to perform the method (see Figs. 5-7).

Regarding claim 17, Wober discloses that the digital camera further comprises memory for storing a plurality of candidate of operators; and wherein the processor is programmed to access the operator by selecting the operator from one of the plurality of candidates (col. 4, lines 20-28 and col. 7, lines 33-40).

Regarding claim 19, Wober also discloses that a standard noise model and a linear minimization technique are used to generate the coefficients (col. 6, lines 7-27).

Regarding claim 20, see the analysis of claims 14 & 18.

Regarding claim 21, Wober also discloses that the values of the demosaicing weights (weighting coefficients) are determined to additionally compensate for image degradation (col. 7, lines 1-22).

Regarding claim 22, see the analysis of claim 17.

Regarding claim 23, Wober discloses the operators being included in T-matrices (transformation matrices) since the data the data is being transformed from pixels with missing color information into pixels with full color information (col. 4, lines 11-30; col. 5, lines 1-65; col. 8, lines 23-30).

Regarding claim 24, col. 7, lines 14-22 shows that at least one property contributes to image degradation.

Regarding claim 25, it is also clear that at least one property is variable from system to system (depending on the camera being used). See col. 7, lines 14-22.

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Regarding claim 26, see the analysis of claim 21.

Regarding claim 27, see the analysis of claims 8 & 18.

Regarding claim 28, Wober discloses at least one image of a known scene (test image, red, green or blue image) is also used to design the coefficients of the linear operator (col. 7, lines 50-53).

Regarding claim 29, it is seen that the mathematical reconstruction matrix shown in **col. 5, lines 36-65** is computed from the camera model and wherein the linear operator is recovered from the reconstruction matrix (col. 6, lines 12-20). The mathematical reconstruction matrix in Wober is not only applied as a 3x3 matrix but can be also applied to any desired array (2x2, 4x4, etc) (col. 5, lines 54-56). Therefore, the claimed limitations are encompassed by such a mathematical equation for the reconstruction matrix with variety of variables.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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4. Claims 3 & 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wober et al (US 5,475,769) in view of Bell (US 5,170,202).

Regarding claims 3 & 4, Wober discloses a method of processing an input digital image produced by an optical system, and further discloses the optical system includes a lens system wherein blur is a property of the lens system used to determine the weight coefficients. Wober does not specifically disclose at least one property is focal length of the lens system.

Bell teaches a contrast-based autofocus mechanism and that for each set of contrast measurements, differences in contrast between successive measurements (either due to change in aperture setting, i.e., f number of focal length) yield a blur circle difference value (col. 2, lines 14-26).

It would have been obvious to one of ordinary skill in the art to recognize that the focal length and f-number values disclosed by Bell would result in the blurring disclosed by Wober, and therefore, the focal length and f-number are clearly optical properties in Wober that determine the weight coefficients.

5. Claims 10 & 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wober et al (US 5,475,769) in view of Acharya (US 6,348,929).

Regarding claim 10, Wober discloses a method of processing an input digital image produced by an optical system as discussed above, but does not specifically disclose the step of applying the operator includes forming of a plurality of input vectors from the input image, each

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input vector formed from super pixels, and applying the operator to the input vectors. However, Acharya teaches a scaling algorithm and architecture for scaling an image wherein each input vector is formed from super pixels (col. 4, line 62 – col. 5, line 3 and col. 6, lines 49-60).

Therefore, it would have been obvious to one of ordinary skill in the art to modify Wober to include each input vector that is formed from super pixels in a manner taught by Acharya to provide an output of varying resolution in a well-known method in the art.

Regarding claim 11, the combination of Wober and Acharya further includes the operator being used for different resolutions and a resulting fixed resolution image is resampled (see Acharya, col. 6, line 56 – col. 7, line 13).

Conclusion

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

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however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nhan T. Tran whose telephone number is (703) 605-4246. The examiner can normally be reached on Monday - Thursday, 8:00am - 6:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Andrew B Christensen can be reached on (703) 308-9644. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

NT.



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